

ABSTRACT OF THE DISCLOSURE

A high-surface-area (greater than $600 \text{ m}^2/\text{g}$), large-pore (pore size greater than 6.5 angstroms), basic zeolite having a structure such as an alkali metal cation-exchanged Y-zeolite is employed to convert NO_x contained in an oxygen-rich exhaust to N_2 and ON_2 . Preferably, the invention relates to a two-stage method and apparatus for NO_x reduction in an oxygen-rich engine exhaust that includes a plasma oxidative stage and a selective reduction stage. The first stage employs a non-thermal plasma treatment of NO_x gases in an oxygen-rich exhaust and is intended to convert NO to NO_2 in the presence of O_2 and added hydrocarbons. The second stage employs a lean- NO_x catalyst including the basic zeolite at relatively low temperatures to convert such NO_2 to environmentally benign gases that include N_2 , CO_2 , and H_2O .